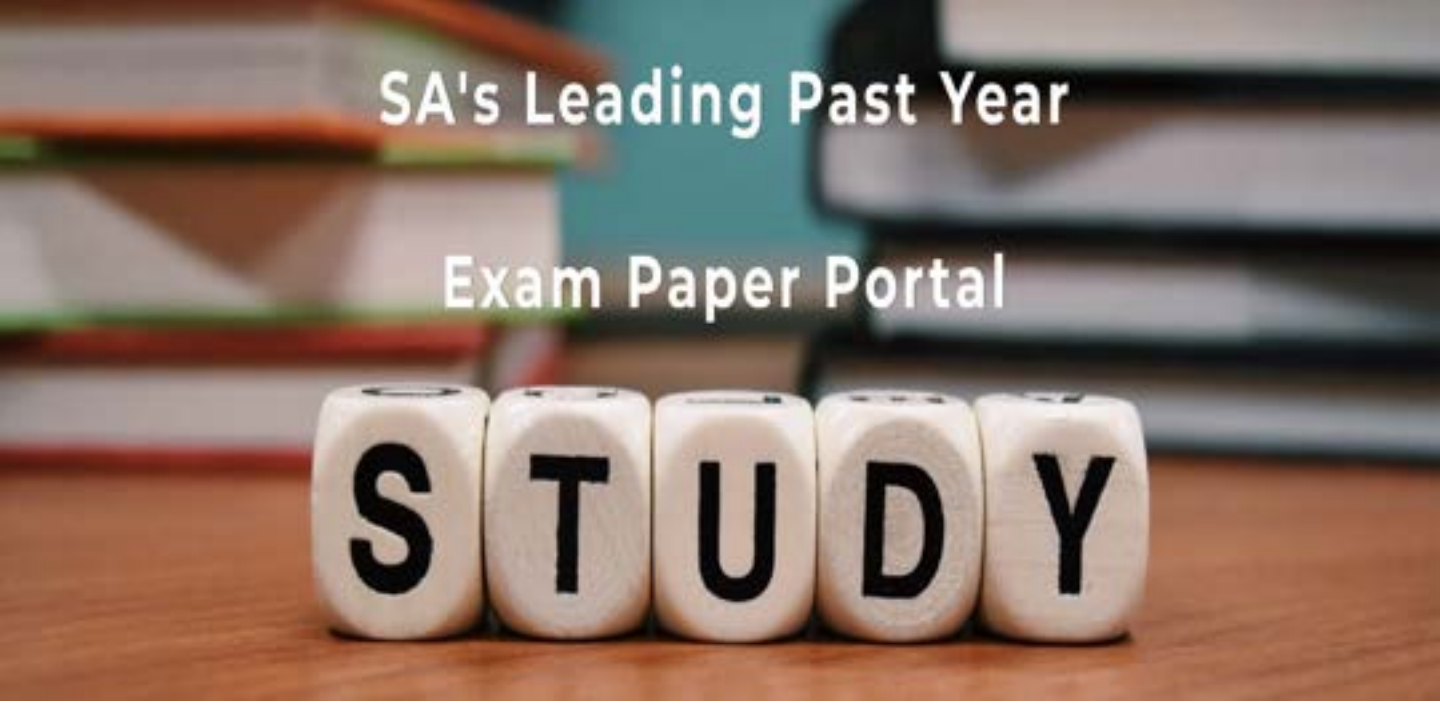

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GRADE 12

LIFE SCIENCES-P2

PREPARATORY EXAMINATION

SEPTEMBER 2021

MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 9 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2020

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are reached and put a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**
   Accept if differences / similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links is incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognized abbreviation but credit the rest of answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognizable accept provided it does not mean something else in Life Sciences or if it is out of context**.**

13. **If common names given in terminology**
    Accept provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
    No credit

15. **If units are not given in measurements**
    Candidates will lose marks. Memorandum will allocate marks for units separately

16. Be sensitive to the **sense of an answer, which may be stated in a different way**.

17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	C✓✓		
	1.1.3	A✓✓		
	1.1.4	C✓✓		
	1.1.5	C✓✓		
	1.1.6	A✓✓		
	1.1.7	D✓✓		
	1.1.8	A✓✓		
	1.1.9	D✓✓	(9 x 2)	**(18)**
1.2	1.2.1	Peptide✓bonds		
	1.2.2	Deoxyribose✓		
	1.2.3	Homologous✓		
	1.2.4	Haploid✓		
	1.2.5	Gonosomes✓		
	1.2.6	Discontinuous✓ variation		
	1.2.7	Artificial selection✓/selective breeding		
	1.2.8	Punctuated equilibrium✓		
	1.2.9	Transitional✓		
	1.2.10	Theory✓	(10 x 1)	**(10)**
1.3	1.3.1	Both A and B✓✓		
	1.3.2	A only✓✓		
	1.3.3	B only✓✓	(3 x 2)	**(6)**
1.4	1.4.1	(a) Amino acid✓		(1)
		(b) tRNA✓/transfer RNA		(1)
	1.4.2	Translation✓		(1)
	1.4.3	(a) AGC✓		(1)
		(b) UGU✓		(1)
	1.4.4	Ribosome✓		(1)
	1.4.5	DNA✓		(1)
	1.4.6	Cytoplasm✓		(1)
				(8)
1.5	1.5.1	2✓		(1)
	1.5.2	(a) EeTt✓✓		(2)
		(b) Attached earlobes and tongue rolling✓✓		(2)
		(c) - eT✓ - et✓		(2)

1.5.3 Law of dominance✓ (1)
(8)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 (a) Hydrogen✓ bond (1)
(b) Guanine✓ (1)

2.1.2 - Has thymine✓
- Double stranded✓
- Nitrogenous bases are bonded✓ Any (2)
(**Mark the first TWO only**)

2.1.3 Interphase✓ (1)
(5)

2.2 - RNA is a single-stranded✓ molecule
- Made up of nucleotides✓
- Each nucleotide has a ribose sugar✓
- a phosphate✓
- and a nitrogenous base✓
- the phosphate group is attached to the ribose sugar✓ and
- the nitrogenous base is attached to ribose sugar✓
- Bases on RNA are arranged in triplets✓
- Nitrogenous bases are; Adenine, Guanine, Cytosine and Uracil✓
- Three types of RNA's are m-RNA, t-RNA and r-RNA✓ Any **(6)**

2.3 2.3.1 Maternal✓origin (1)

2.3.2 (a) 22✓ (1)
(b) 2✓ (1)

2.3.3 - Chromosome/chromatids in pair number 16 did not separate✓/non-disjunction
- during anaphase I✓/II
- A gamete formed will have an extra chromosome✓/2 instead of 1 in pair number 16
- This gamete with extra chromosome fused with a normal gamete during fertilisation✓
- forming a cell with an extra/3 chromosomes✓ in pair 16 Any (4)
(7)

2.4 *Crossing over✓
- Chromosomes come together forming homologous pairs✓
- Chromatids of a homologous pair overlap✓
- forming a point called chiasma✓
- at which genetic material is exchanged✓
***Compulsory mark** 1 + Any 3 **(4)**

2.5 2.5.1 Incomplete dominance✓ (1)

2.5.2 1:2✓ (1)

2.5.3 $\left\{\frac{942}{3880}\right\}$ ✓ x 100✓ = 24.28✓/ 24% (3)

2.5.4 **P_1** Phenotype Orange x Orange✓
Genotype RY x RY✓
Meiosis
Gametes R, Y x R, Y✓
Fertilisation
F_1 Genotype RR, RY RY, YY✓
Phenotype * Red, 2 orange, yellow✓

P_1 and F_1✓
Meiosis and fertilisation✓
***Compulsory mark**

OR

P_1 Phenotype Normal female x Normal male✓
Genotype RY x RY✓

Meiosis

Fertilisation

F_1

Gametes	R	Y
R	RR	RY
Y	RY	YY

1 mark for correct gametes
1 mark for correct genotypes

Phenotype * Red, 2 orange and yellow ✓

P_1 and F_1✓
Meiosis and fertilisation✓
***Compulsory mark** 1 + Any 5 (6)
(11)

2.6
- The blood group of a child is determined by the alleles received from both parents✓
- The blood group of the mother, the child and the possible father is determined✓
- If the blood group of the mother and possible father cannot lead to the blood group of the child✓
- the man is not the father✓
- If the blood group of the mother and the possible father can lead to the blood group of the child✓
- the man might be the father✓
- This is not conclusive✓
- because many men have the same blood group✓ Any **(6)**

2.7	2.7.1	(a) Hunter syndrome male✓	(1)
		(b) - X^TX^T✓ - X^TX^t✓	(2)
	2.7.2	Ethel✓	(1)
	2.7.3	40%✓✓	(2)
	2.7.4	- Lucky is hunter syndrome male✓ - And has the defective allele✓/X^t - Male children inherit X chromosomes only from their mother✓ and - Y chromosome only from their father✓ - Lucky's condition is from inheriting X^t from the mother✓	(5)
			(11)
			[50]

QUESTION 3

3.1	3.1.1	Manipulation of biological processes to satisfy human needs.✓✓	(2)
	3.1.2	- Improve yield✓ - Tolerance of herbicides✓ Any **Mark the first ONE only**	(1)
	3.1.3	- They may have side-effects✓ - which may be negative to human health✓ /may cause allergies	(2)
			(5)
3.2	3.2.1	Insect resistance✓	(1)
	3.2.2	Counting the average grain yield in each plot✓	(1)
	3.2.3	- Same number of maize seeds sown on each plot✓ - Same size of plots✓ - Same environmental conditions✓ - Same type of insects were introduced✓/ same number of insects - Same period of growth before counting✓ Any **Mark the first TWO only**	(2)
	3.2.4	- To serve as control✓ - so that it can be compared with the other group✓ - and show that the Bt gene is the only factor that affects the results✓/improves the validity of the investigation	(3)
	3.2.5	To increase the reliability✓ of the investigation	(1)
			(8)

3.3	3.3.1	(a) E✓		(1)
		(b) - D✓ - F✓		(2)
	3.3.2	- Pelvis changed from long and narrow✓ - to short and wide in humans✓ - to support upper body weight✓		(3)
	3.3.3	- Allows space for a larger brain✓ - for processing a large amount of information✓ - and development of communication skills✓	Any	(2)
	3.3.4	- It is in central position✓ - to support the skull✓/cushion the skull		(2)
	3.3.5	- Smaller jaws✓/teeth in diagram E - Fire is used to cook food✓ - to make it softer✓ - because of decreased need to bite and tear✓	Any	(3) **(13)**
3.4	3.4.1	- Prevention of fertilization✓ - Differences in behavior✓ - non-biological factors✓/differences in range - Infertile offspring✓ **Mark the first THREE only**	Any	(3)
	3.4.2	Liger✓		(1) **(4)**
3.5		- If a population of a single species becomes separated by a geographical barrier✓ (sea, river, mountain, lake) - then the population splits✓ into two - There is now no gene flow between the two populations✓ - Since each population may be exposed to different environmental conditions✓/the selection pressure may be different - natural selection occurs independently in each of the two populations✓ - such that the individuals of the two populations become very different✓ from each other - genotypically and phenotypically✓ - Even if the two populations were to mix again✓ - they will not be able to interbreed✓ - The two populations are now different species✓	Any	**(7)**
3.6	3.6.1	(a) 3✓ (b) 0.5 million years ago✓/500 000 years ago		(1) (1)
	3.6.2	(a) - Homo habilis✓ - Australopithecus africanus✓ **Mark the first TWO only**		(2)

(b) - Homo sapiens✓
- Homo eructus✓
- Homo habilis✓ Any (2)

Mark the first TWO only

3.6.3 Homo✓ (1)
(7)

3.7
- There is a great deal of variation amongst the offspring✓
- Some have favourable characteristics and some do not✓
- When there is a change in the environmental conditions✓/competition
- then organisms with characteristics, which make them more suited, survive✓
- whilst organisms with unfavourable characteristics, which make them less suited, die✓
- The organisms that survive, reproduce✓
- and thus, pass on the allele for the favourable characteristic to their offspring✓
- The next generation will therefore have a higher proportion of individuals with the favourable characteristic✓ Any **(6)**
[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150